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Design and implement a knowledge management system to support web-based learning in higher education

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Abstract

Today most colleges have web-based learning system to keep a large number of course resources during higher education process. However, these systems aiming to display course resources often neglect users' knowledge management requirement. Traditional course-based learning confines knowledge to one course. But both teachers and learners often require extracting useful knowledge from course for themselves. Besides, with development of mobile technology, learning with convenient devices was required by college students. Lack of knowledge services and limited clients constrict the development of web-based learning. Taking Tsinghua University as a typical case and according to the knowledge management theory, this paper designed and implemented a knowledge management system (KMS-THU) to support knowledge service for Tsinghua Web School (THU-WS), which is a web-based learning platform of Tsinghua. KMS-THU focuses on knowledge management by people and also abstracts distinctive knowledge services for courses. With campus cloud service and varies mobile clients, it brings a ubiquitous learning style to optimize the learning experience. Besides illustrating design of knowledge service and framework of KMS for web-based learning, this paper set forth the technical details for KMS-THU implementation.

Keywords: knowledge management, knowledge management system, web-based learning, ubiquitous learning; higher education

1. Introduction

With the development and popularization of web technologies, web-based learning is becoming more and more acceptable by people. As the education pioneers, many colleges began to establish their web-based learning system to support distance higher education in the late 90's. Large project such as CALAT; CALsurf; WebCAI; The University of the Air; California Virtual University; WIDE University were established during this time [1-2]. These systems are usually used for course resource display, homework assignment and class

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discussion. By publishing or viewing the online source easily through browsers to web, both teacher and student benefit from web-based learning [3-4].

However, neglecting the personalized demand, resources are often organized by teachers in fixed course scope. This inflexible model could not meet the diverse KM requirement from different learners. The inconvenience may make quality knowledge be overlooked. In addition, since a mobile-internet age is coming, learning with intelligent mobile device becomes a new learning trend as a complement of learning with PC. In order to promote the web-based learning platform, a knowledge management system (KMS) is proposed to support it.

Knowledge management is one of the hottest topics in management [5-6]. Knowledge management system (KMS) becomes a useful tool to manage knowledge as most knowledge exists in the form of digital document today. KMS succeeds in many famous enterprises, such as Siemens, one of the most successful international enterprises in the world [7]. However, KMS's important value has not been recognized in education domain yet. Few universities have their own KMS. Although there are all kinds of KMS built by Profit institutions, the efficiency, safety and reliability of the server cannot be assured.

Tsinghua University is one of the top Universities of China. Its web-based learning system called Tsinghua Web School (THU-WS) has been developed for more than 20 years since the information system prospered. Like most e-learning systems in university, such as noted teaching platform *Blackboard*† from Unite States which widely used in universities, THU-WS is used as a platform for course wares display, homework publication and course discussion. It is a typical course-based learning system. More than 80% teachers and almost all students in Tsinghua use THU-WS.

Although THU-WS significantly changes the mode of teaching and learning in Tsinghua in past decade, it pays much more attention on course than person. Teaching is a human-to-human process mainly aiming to convey knowledge from teacher to students, and feedbacks from students to teacher. Course is only a medium to connect participants. Teachers need to collect interactive information while students need to select the useful content from a course, consume it and re-organize it by themselves. From this aspect, the course-based mode could not cover the whole teaching process.

By analyzing usage of THU-WS, this paper designed and implemented a KMS of Tsinghua University (KMS-THU) as a support for THU-WS. KMS-THU makes knowledge management in learning easier; users could organize knowledge in their own way and search knowledge in KMS conveniently. Knowledge management by individual or free-established group with KMS-THU crosses the barrier of course. Meanwhile, for educational process, KMS offers all kinds of clients to bring a chance of ubiquitous learning. Framework of KMS-THU shows an approach of building an educational knowledge management system.

2. Usage of knowledge management system supporting Web School

Some of course resources in THU-WS are from teachers. Teachers publish course resources to the web school to assist learning. The other resources may come from students. Discussion or sharing knowledge in a class of students is often valuable for both teachers and students.

However, course-based learning is not sufficient for higher education today. First, not all resources in one course are valuable for everybody in the class. In university, students from all kinds of departments or students of different research interests come together to have the same course because of distinctive purposes. The points they focus differ a lot. They should select the part of resources helpful for themselves and organize them in their own way. Second, integration of different course resources is necessary for learning. Third, all the sharing activities are limited inside the course but knowledge transform and transfer to a certain research group with need of it is more beneficial for knowledge reuse and recreation.

† *http://www.blackboard.com/*